

REMARKS

Reconsideration of the present application is respectfully requested. Claims 1, 8, and 13 have been amended. Claim 30 has been canceled. Claims 1-29 and 33-40 are currently pending.

Claims 8, 13, and 30 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. In claim 8, it is asserted that "said conducting strips" has no antecedent basis. In claim 13, it is asserted that "the conducting strips" has no antecedent basis. Regarding claim 30, the Office Action inquires what is meant by "the antenna system is smaller than a half of the free-space operating wavelength." Claims 8 and 13 have been amended for proper antecedent basis. Claim 30 has been canceled. In view of the foregoing, Applicant respectfully requests that the 35 U.S.C. 112 rejections of claims 8 and 13 be withdrawn.

Claims 1-3, 9-12, 25, 27, 29, 30, 33-34, and 40 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,497,167 to Luoma ("Luoma"). Independent claim 1 is directed to an antenna system of the type used in a handheld electronic device. Independent claim 1 has been amended to include the feature of "wherein the ground plane is disposed in a plane substantially parallel to a plane of the antenna element." Support for this amendment to independent claim 1 can be found in at least Figs 3B, 4B, and 5B of the application as originally filed. Independent claim 1 has further been amended to include the feature of "wherein the ground-plane contributes to the radiation performance of the antenna system by increasing a number of frequency bands of the antenna system so as to enhance a multiband behavior of the antenna system." Support for this amendment to independent claim 1 can be found at at least page 2, lines 16-24; page 4, lines 22-29; and page 7, lines 3-4 of the application as originally filed.

Luoma describes a mobile telephone antenna for mounting onto a window of a motor vehicle. Luoma describes the antenna as including an H-shaped ground plane turned to the horizontal plane and a vertical radiator essentially perpendicular to the H-shaped ground-plane. Applicant submits that Luoma fails to teach or suggest an antenna system of the type used in a handheld electronic device as found in independent claim 1. As described, for example in column 4, lines 13-17, the antenna of Luoma is of a type to be mounted to the window of a motor vehicle, not for use in a mobile device.

Further, Applicant respectfully submits that Luoma fails to teach or suggest the feature of independent 1 as amended of "wherein the ground plane is disposed in a plane substantially parallel to a plane of the antenna element." As illustrated in Fig. 1 and described in column 4, lines 13-26 of Luoma, the antenna of Luoma includes a vertical radiator 2 installed perpendicular to an H-shaped ground plane 1. Applicant respectfully submits that Luoma contains no teaching or suggestion that the radiator 2 can be disposed in a plane substantially parallel to the plane of the ground plane 1.

Additionally, Applicant respectfully submits that Luoma fails to teach or suggest the feature of independent claim 1 as amended of "wherein the ground-plane contributes to the radiation performance of the antenna system by increasing a number of frequency bands of the antenna system so as to enhance a multiband behavior of the antenna system." In accordance with the principles of the presently claimed invention, as described, for example, on page 2, lines 16-24; page 4, lines 22-29; and page 7, lines 3-4 of the application as originally filed, the ground plane as claimed provides for an increase in the number of frequency bands of the antenna system by provoking a current distribution over the ground plane that achieves this purpose. This is achieved by forcing the currents on the ground plane to flow and radiate in a corresponding manner. Applicant respectfully submits that Luoma contains no teaching or suggestion of such a feature.

Attached hereto as Exhibit A, and submitted in an Information Disclosure Statement mailed May 17, 2006, is a copy of a document entitled "Enhancing the Performance of Handset Antennas by means of Groundplane Design," by Jaume Anguera et al, the contents of which were presented at the 2006 IEEE International Workshop on Antenna Technology: Small Antennas and Novel Metamaterials (IWAT), March 6-8, 2006, Crowne Plaza Hotel in White Plains, New York. The Anguera document describes an example of a ground plane that is used, in accordance with the principles of the invention as claimed in claim 1, so as to increase the number of frequency bands of an antenna. For example, note in Figure 3 of Anguera that the "tuned" PCB provides an additional resonant frequency that improves the return losses curve featuring an increased bandwidth in the lower frequency range, thus adding a further frequency band in said lower frequency range. Thus, a "quadband" antenna, featuring four frequency bands, namely, GSM850 (824-890MHz), GSM900 (880-960MHz), DCS1800 (1710-1880MHz) and DCS1900 (1850-1990MHz) is achieved. That is, an antenna featuring more frequency

bands and thus an enhanced multiband behaviour is achieved compared to a similar antenna with a conventional ground plane. For at least the foregoing reasons, Applicant respectfully submits that independent claim 1 as amended distinguishes over Luoma, and requests that the 35 U.S.C. 102(b) rejection of independent claim 1 be withdrawn.

Claims 2-3, 9-12, 25, 27, 29, 33-34, and 40 are dependent upon and include the features of independent claim 1. For at least the reasons discussed with respect to independent claim 1, Applicant respectfully submits that claims 2-3, 9-12, 25, 27, 29, 33-34, and 40 also distinguish over Luoma, and requests that the 35 U.S.C. 102(b) rejections of claims 2-3, 9-12, 25, 27, 29, 33-34, and 40 be withdrawn.

Claims 1-3, 9-12, 27, and 40 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,911,939 to Carson et al. ("Carson"). Carson is directed to an antenna system for producing dual polarization states with controlled RF beamwidths. The Office Action asserts that Figures 8-9 of Carson teach the features of independent claim 1. In particular, the Office Action asserts that the ground plane 530 in Figures 8-9 of Carson teaches the features of the "ground plane" of independent claim 1. Applicant respectfully disagrees. As illustrated in Figures 8-9 and as described in column 5, lines 54-58; column 8, lines 17-21; and column 9, lines 52-67 of Carson, the ground plane 530 is not the ground plane of the radiating element 110 of the antenna system 100, but is instead the ground plane of the printed circuit board 150. The ground plane 120 of Carson appears to be the ground plane associated with the radiating element 110, and is shown as a rectangular-shaped ground plane. The ground plane 120 does not possess the features of independent claim 1 of "at least two conducting surfaces each having a plurality of sides defined by at least one edge; at least one conducting strip connecting said at least two conducting surfaces for allowing current to flow between said at least two conducting surfaces; and said strip being narrower than the width of any of said at least two conducting surfaces."

Further, Applicant respectfully submits that there is no teaching or suggestion by Carson of a ground plane "wherein the ground-plane contributes to the radiation performance of the antenna system by increasing a number of frequency bands of the antenna system so as to enhance a multiband behavior of the antenna system" as found in independent claim 1 as amended. For at least the foregoing reasons, Applicant respectfully submits that independent

claim 1 distinguishes over Carson and requests that the 35 U.S.C. 102(e) rejection of independent claim 1 be withdrawn.

Claims 2-3, 9-12, 27, and 40 are dependent upon and include the features of independent claim 1. For at least the reasons discussed with respect to independent claim 1, Applicant respectfully submits that claims 2-3, 9-12, 27, and 40 also distinguish over Carson, and requests that the 35 U.S.C. 102(e) rejections of claims 2-3, 9-12, 27, and 40 be withdrawn.

Claims 35 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Luoma in view of U.S. Patent No. 6,400,330 to Maruyama et al. ("Maruyama"). Claim 35 is dependent upon and includes the features of independent claim 1. As discussed with respect to independent claim 1, Luoma fails to teach or suggest the features of independent claim 1 as amended. Maruyama describes a bar antenna including a single body ferromagnetic substance core, a bobbin which accommodates the core in a hollow space and having a plurality of coil windings. Maruyama further describes that the core and the bobbin are positioned in a case, and that a potting material is in the case and/or bobbin to isolate the core from temperature changes, humidity changes, and vibration. Applicant respectfully submits that Maruyama fails to teach or suggest the features of independent claim 1 of "wherein the ground plane is disposed in a plane substantially parallel to a plane of the antenna element" or "wherein the ground-plane contributes to the radiation performance of the antenna system by increasing a number of frequency bands of the antenna system so as to enhance a multiband behavior of the antenna system." For at least the foregoing reasons, Applicant respectfully submits that claim 35 distinguishes over Luoma in view of Maruyama and requests that the 35 U.S.C. 103(a) rejection of claim 35 be withdrawn.

Claim 36 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Luoma in view of U.S. Patent No. 6,271,798 to Endo et al. ("Endo"). Claim 36 is dependent upon and includes the features of independent claim 1. As discussed with respect to independent claim 1, Luoma fails to teach or suggest the features of independent claim 1 as amended. Endo describes an antenna apparatus for use in an automobile that includes an antenna control section for electronically and variably controlling (beam-steering or beam-scanning) an emitting-beam pattern of each of antennas mounted on the automobile, based on high-precision positional information of the automobile. Applicant respectfully submits that Endo fails to teach or suggest

the features of independent claim 1 of "wherein the ground plane is disposed in a plane substantially parallel to a plane of the antenna element" or "wherein the ground-plane contributes to the radiation performance of the antenna system by increasing a number of frequency bands of the antenna system so as to enhance a multiband behavior of the antenna system." For at least the foregoing reasons, Applicant respectfully submits that claim 36 distinguishes over Luoma in view of Endo and requests that the 35 U.S.C. 103(a) rejection of claim 36 be withdrawn.

Claims 26, 28, 38, and 39 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Luoma in view of U.S. Patent No. 6,885,880 to Ali ("Ali"). Claims 26, 28, 38, and 39 are dependent upon and includes the features of independent claim 1. As discussed with respect to independent claim 1, Luoma fails to teach or suggest the features of independent claim 1 as amended. Ali describes a flip or clam-shell style mobile terminal including a mechanical hinge that doubles as an inverted-F antenna for auxiliary communication purposes such as with a Bluetooth transceiver or a GPS receiver. Ali contains no teaching or suggestion of an antenna system including an antenna element and a ground plane including "at least two conducting surfaces each having a plurality of sides defined by at least one edge; at least one conducting strip connecting said at least two conducting surfaces for allowing current to flow between said at least two conducting surfaces; and said strip being narrower than the width of any of said at least two conducting surfaces, wherein the ground plane is disposed in a plane substantially parallel to a plane of the antenna element" as found in independent claim 1 as amended. Ali also fails to teach or suggest the feature of independent claim 1 as amended of "wherein the ground-plane contributes to the radiation performance of the antenna system by increasing a number of frequency bands of the antenna system so as to enhance a multiband behavior of the antenna system." For at least the foregoing reasons, Applicant respectfully submits that claims 26, 28, 38, and 39 distinguish over Luoma in view of Ali and requests that the 35 U.S.C. 103(a) rejections of claims 26, 28, 38, and 39 be withdrawn.

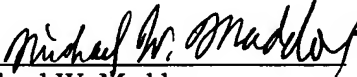
Claims 4-7 and 14-24 are indicated on page 8 of the Office Action as being objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 8 and 13 are indicated as being allowable if rewritten to overcome the rejections under 35 U.S.C. 112, 2nd paragraph and to include all of the limitations of the base claim and any

intervening claims. Applicant wishes to thank the Examiner for the indication of allowable subject matter.

In view of the above amendment, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

By 

Michael W. Maddox

Registration No.: 47,764

JENKENS & GILCHRIST, A PROFESSIONAL
CORPORATION

1445 Ross Avenue, Suite 3700

Dallas, Texas 75202

(214) 855-4500

Attorneys For Applicant